

Films for eliciting emotional states in children

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Standardized sets of films have been shown to be effective for eliciting emotional states in adults, but no comparable validated stimuli are available for children. We therefore examined the effects of three pre-selected film clips each of 3-min duration in eliciting a pleasant, neutral and unpleasant emotional state in 297 children aged between 6 and 12 years. After the films were presented on a video projector, affective ratings were obtained with the Self-Assessment-Manikin on the emotional dimensions of valence and arousal. Increasing pleasure ratings were observed from the unpleasant to the neutral to the pleasant film. Associated arousal ratings were stronger for the unpleasant and pleasant films compared to the neutral film. Overall, results showed successful elicitation of targeted emotional states only marginally influenced by age, gender or prior experience with the films. The use of these films is therefore suggested for future studies on emotions in children.

Research on emotions has become an increasingly popular topic in the biopsychosocial sciences in past decades. Numerous studies have examined various distinct aspects of emotions, including their influence on other psychological processes such as memory (e.g., Gentzler & Kerns, 2006), interactions with peripheral physiological processes such as respiration (e.g., von Leupoldt & Dahme, 2005) and cortical correlates (e.g., Sabatinelli, Bradley, Fitzsimmons, & Lang, 2005). Studies such as these require stimuli which reliably elicit emotional states. Typical methods include affective pictures (e.g., Lang, Bradley, & Cuthbert, 1999), music (e.g., Sutherland, Newman, & Rachman, 1982), hypnosis (e.g., Rainville, Bao, & Chretien, 2005), self-referential statements (e.g., Velten, 1968), facial expressions (Ekman, Levenson, & Friesen, 1983), odors (e.g., Villemure, Slotnick, & Bushnell, 2003), films (e.g., Gross & Levenson, 1995) and many more (for review, see Bradley, 2000; Coan & Allen, 2007). In recent years, standardized sets of well validated emotive pictures (e.g., Lang et al., 1999) or films (Gross & Levenson, 1995) developed for the use in adult populations have found widespread acceptance.

However, there are no comparable instruments available for eliciting emotional states in children. Recent studies with pediatric participants have mostly developed or used own stimulation material, among which film clips seem to have been successful instruments (e.g., Miller & Wood, 1997; Rietveld & Prins, 1998). Film clips have indeed been shown to be highly effective, at least in adult populations, in eliciting emotions because they are dynamic, readily standardized, capable of inducing activations across many emotional response systems, of reasonable ecological validity and fairly successful in capturing

attention (Rottenberg, Ray, & Gross, 2007). Moreover, viewing conditions, presentation apparatus and stimulus content can be well controlled, thus allowing for potential replication of observed effects across different research groups (Gross & Levenson, 1995). Since most children are experienced in and enjoy watching films, films might also be effective for emotion induction in this population and are probably more naturalistic and generalizable than other instruments (Gross & Levenson, 1995).

Therefore, the present study selected three film clips capable of reliably eliciting pleasant, neutral and unpleasant emotional states in children and examined the emotional responses to these films in a larger pediatric sample.

METHOD

Participants

A total of 163 male and 134 female children were recruited for this study. Participants' ages ranged from 6 to 12 years (mean age = 8.7 years, $SD = 1.6$). Written informed consent was obtained from the parents of all participating children. The study was approved by the institutional review boards of the Ministries of Education of Hamburg and Mecklenburg-Western Pomerania.

Materials

From a larger sample of full-length commercial cartoon films, psychologists selected five films based on their judgments of the emotional impact of the films on children. From these, three short film clips were selected and generated on the basis of previously suggested criteria (Rottenberg et al. 2007): (1) valence—films had to be of either pleasant, neutral or unpleasant valence; (2) length—films had to last 3 min; (3) intelligibility—the content had to be understandable without further explanation; (4) color—all films had to be in color; (5) sound—all films had to have a sound track; (6) complexity—all films had to be roughly comparable in terms of the scenes displayed (background–foreground balance, displayed

Table 1
Details of the Emotive Films Presented

	Film		
	Pleasant	Neutral	Unpleasant
Name	<i>The Jungle Book</i>	<i>The Last Unicorn</i>	<i>The Lion King</i>
Authors	Wolfgang Reitherman	Arthur Rankin, Jr., and Jules Bass	Roger Allers and Rob Minkoff
Company	Walt Disney	ITC Film	Walt Disney
Original	1967	1982	1994
DVD version	2000 (Walt Disney)	2001 (Concorde)	2003 (Buena Vista)
Length	3 min	3 min	3 min
Time frame	0:24:15–0:27:15	0:00:00–0:03:00	0:34:25–0:37:25
Content	Baloo the Bear explains what is important in life to the boy Mowgli by singing the song “The Bare Necessities.” He sings about a simple and relaxing way of life in nature, preferably without much work to do. While singing, he dances with Mowgli in a slapstick style. Bagheera the Panther watches the scene from a tree and is appalled at Baloo’s statements.	The opening credits of the film depict an eagle flying over natural scenery. Animals, trees, flowers, fountains, and a unicorn appear, presented unemotionally. The names of cast and crew are shown, accompanied by music.	Simba, son of the Lion King Mufasa, searches for his father in a canyon, and, on finding him dead on the ground, cries, accompanied by music. Simba feels guilty for his father’s death. His evil uncle Scar appears and advises him to run away and never come back. Simba starts running, and Scar orders his hyena servants to chase and murder him.

Note—The German versions of the films were used.

characters); and (7) picture motion—all films had to depict moving scenes. Details of the films are presented in Table 1.

Measures

The affective responses to the films on the two emotional dimensions of valence and arousal were measured using a paper and pencil version of the Self Assessment Manikin (SAM) (Hodes, Cook, & Lang, 1985). The children rated how *pleasant/happy/amused* (9) or *unpleasant/unhappy/sad* (1) they felt while watching the films and their associated level of arousal from *highly aroused/excited* (9) to *not aroused/relaxed* (1) on a 9-point Likert scale. This measure was chosen because it depicts a drawn manikin which supports children’s understanding of affective ratings and has already been used successfully in a larger pediatric sample (Sharp, van Goozen, & Goodyer, 2006). In addition, children were asked if they had seen the selected films previously, and, if so, how often.

Procedure

Data collection was performed in three schools. All three films were shown to groups of children (group size ranged from 9 to 29 participants; mean = 19) on a video projector in a normal light-dimmed classroom. After a short welcome and warm-up period, detailed and standardized instructions about the procedure and rating instruments were provided, with several examples being shown and questions answered. The experimenters stated that the purpose of the study was to learn how children feel during watching films, regardless of what is being displayed. The children were instructed to watch carefully and to engage with the films as much as possible. The pleasant, neutral, and unpleasant film clips were then shown to the children in counterbalanced order across all groups, separated by 5-min intervals. The children recorded their affective ratings of the emotional experience during the complete film directly after each presentation. Children were free to withdraw at any time during the tests, which lasted about 45 min in total.

Data Analysis

The children were grouped into three age categories (1 = 6–7 years; 2 = 8–9 years; 3 = 10–12 years) to adjust for differences in group size. Mood ratings of valence and arousal were analyzed as dependent variables in separate 3 (film: pleasant, neutral, unpleasant) \times 2 (gender: male, female) \times 3 (age category: 1, 2, 3) ANOVAs with repeated measurements. Bonferroni-corrected, univariate pairwise comparisons were performed to follow up the main effects.

A Greenhouse–Geisser correction was applied in cases of violated sphericity assumptions with corrected significance levels being reported. The influence of children’s prior watching of the films on the emotion eliciting effects was tested by computing rank correlations (Spearman’s rho, $p < .05$, two-tailed) between valence and arousal ratings, respectively, and the number of prior experiences of the film. All analyses were calculated using SPSS 11.5 software.

RESULTS

Affective ratings (Table 2) differed significantly for the three films in terms of valence [$F(2,290) = 817.24$, $p < .001$, $\epsilon = .737$] and arousal [$F(2,290) = 45.09$, $p < .001$, $\epsilon = .134$]. As illustrated in Figure 1 (upper panel), *valence ratings* showed significant increases from the unpleasant to the neutral film [$F(1,296) = 511.35$, $p < .001$, $\epsilon = .633$], from the neutral to the pleasant film [$F(1,296) = 209.32$, $p < .001$, $\epsilon = .414$] and from the unpleasant to the pleasant film [$F(1,296) = 2256.73$, $p < .001$, $\epsilon = .884$]. Valence ratings showed a significant interaction effect for film \times gender [$F(2,290) = 3.35$, $p < .05$, $\epsilon = .011$]. Univariate tests demonstrated that this was due to stronger unpleasantness ratings in female children during the unpleasant film [$F(1,296) = 9.66$, $p < .01$], while no gender differences were obtained for the neutral and pleasant film. Valence ratings demonstrated a further significant interaction effect for film \times age category [$F(2,290) = 3.07$, $p < .05$, $\epsilon = .021$]. Univariate tests revealed that younger children (6–7 years) reported more pleasantness than older children (10–12 years) for the neutral film [$F(1,186) = 7.23$, $p < .05$], while no significant differences were obtained between the age categories for the pleasant and unpleasant film.

As illustrated in Figure 1 (lower panel), *arousal ratings* were significantly stronger for the unpleasant film [$F(1,296) = 99.34$, $p < .001$], and the pleasant film [$F(1,296) = 42.23$, $p < .001$], when compared to the neutral film. The unpleasant film was rated slightly more

Table 2
Means (and Standard Deviations) of Valence and Arousal Ratings for the Pleasant, Neutral, and Unpleasant Films

Age Category (n)	Pleasant				Neutral				Unpleasant			
	Valence		Arousal		Valence		Arousal		Valence		Arousal	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
6–7 Years												
Girls (38)	8.39	1.52	4.24	3.77	6.18	3.53	2.00	2.11	2.21	2.37	4.13	3.21
Boys (50)	8.38	1.81	4.16	3.64	7.14	2.64	3.42	3.30	3.02	2.90	5.08	3.56
Combined (88)	8.39	1.68	4.19	3.68	6.73	3.08	2.81	2.92	2.67	2.70	4.67	3.42
8–9 Years												
Girls (50)	8.80	0.70	3.98	3.27	6.38	2.16	3.06	2.40	1.94	1.54	5.50	2.49
Boys (60)	8.63	0.96	3.82	3.22	6.25	2.41	3.02	2.55	2.57	2.17	5.10	2.86
Combined (110)	8.71	0.85	3.89	3.23	6.31	2.29	3.04	2.48	2.28	1.93	5.28	2.69
10–12 Years												
Girls (46)	8.78	0.59	4.46	2.96	5.70	2.30	2.65	1.90	1.61	1.13	5.20	2.60
Boys (53)	8.70	0.67	4.64	3.10	5.70	1.98	2.42	1.82	2.36	1.52	4.38	2.39
Combined (99)	8.74	0.63	4.56	3.02	5.70	2.12	2.53	1.85	2.01	1.40	4.76	2.51
Total Sample												
Girls (134)	8.68	0.99	4.22	3.30	6.09	2.66	2.62	2.18	1.90	1.71	5.01	2.78
Boys (163)	8.58	1.22	4.19	3.31	6.34	2.41	2.94	2.63	2.64	2.25	4.86	2.96
Combined (297)	8.62	1.12	4.20	3.30	6.23	2.52	2.80	2.44	2.31	2.06	4.93	2.88

arousing than the positive film [$F(1,296) = 8.22, p < .05$]. No differences in arousal ratings were obtained between gender or age categories.

Prior watching of the pleasant and neutral films showed weak correlations with valence ratings [$r(297) = 0.226, p < .001$, and $r(297) = 0.123, p < .05$, respectively], indicating that prior knowledge of the films was associated with slightly stronger pleasantness during the tests. No significant correlations were found for the unpleasant film and for the arousal ratings.

DISCUSSION

The results of this study demonstrate significant differences in affective responses to each of the three films. Children's valence ratings increased from the unpleasant to the neutral to the pleasant film, thus confirming the targeted low pleasure during the unpleasant film, medium pleasure during the neutral film and high pleasure during the pleasant film. Arousal ratings showed the expected higher arousal during the unpleasant and pleasant film compared to the neutral film, with somewhat higher ratings for the unpleasant film when compared to the pleasant film.

These observations confirm the emotion eliciting effect of the selected films and converge with previous reports on emotion elicitation with affective picture series in adults using the Self-Assessment-Manikin for measuring affective responses. Numerous studies obtained similar increases in valence ratings from unpleasant to neutral to pleasant pictures, paralleled by higher arousal during unpleasant and pleasant pictures compared to neutral pictures (e.g., Bradley, Cuthbert, & Lang, 1996; Lang, Bradley, & Cuthbert, 1997; Ritz, Alatupa, Thöns, & Dahme, 2002; von Leupoldt & Dahme, 2005). These studies also reported slightly more arousal during unpleasant compared to pleasant emotional stimulation. Our main results, however, are not directly comparable with the previously developed sets of emotional films for use in adult populations, (e.g., Gross & Levenson, 1995; Philippot, 1993; Rottenberg et al., 2007) as those sets were created and

examined according to a categorical model of discrete emotions, while the present study employed a dimensional model of emotions for the selection of films and the assessment of their effects. Hence, future studies are

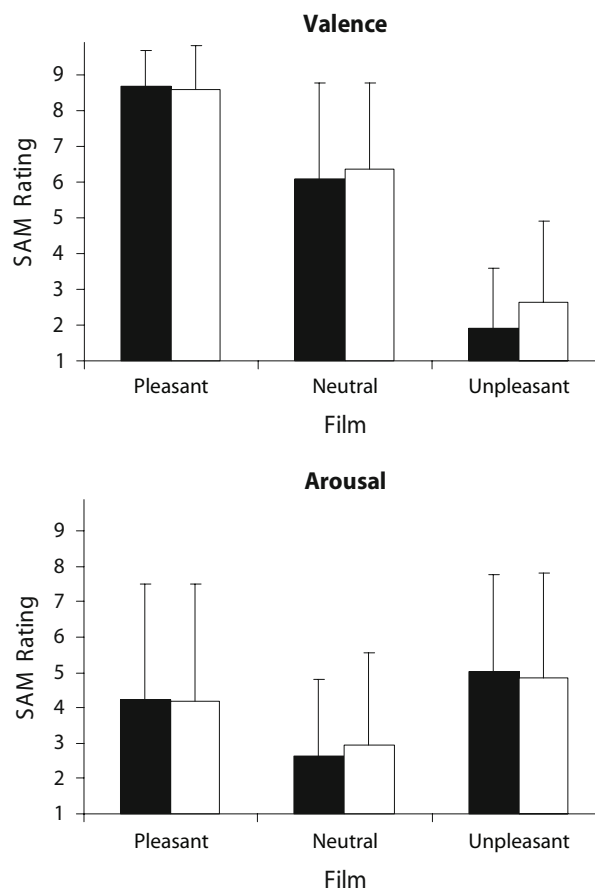


Figure 1. Mean ratings for valence (upper panel) and arousal (lower panel) for the pleasant, neutral, and unpleasant film averaged across all participating girls (filled bars) and boys (unfilled bars). Error bars represent the standard deviation of the means.

required to show the effects of the films presented in this study on the elicitation of discrete emotions.

In the present study, we observed a gender influence on affective responses, with girls showing stronger valence ratings than boys, as has also been reported with respect to discrete emotions in studies by Gross and Levenson (1995) and Rottenberg et al. (2007) in adults. Particularly during the unpleasant film, girls in the present study reported significantly more unpleasantness than boys, while no effects on the levels of arousal experienced were observed. A similar gender effect on valence ratings but not on arousal ratings during unpleasant emotional stimulation has been reported in a study by Sharp et al. (2006) in children of comparable age who were stimulated with affective pictures. Thus, the known gender differences in response to emotional stimulation (e.g., Bradley & Lang, 2000) seem to be readily present in early stages of development, irrespective of the stimulation technique employed.

Children's age had no major impact on the emotion eliciting effects of the films. In the neutral film only, it was found that younger children (6–7 years) experienced more pleasantness than older children (10–12 years). No further effects of age were obtained. Future studies with these films are required to reveal whether this finding is systematic or specific to the present sample.

Prior knowledge of the films showed only a weak influence on the affective responses in this study. Significant correlations were observed only in valence ratings for the pleasant and neutral film, suggesting that children who had seen these films more often before the tests experienced more pleasantness than those who had seen the films less often. This finding is consistent with results of Gross and Levenson (1995), whose study showed stronger levels of target emotions in adults who had previously seen the films rated in the study. However, having regard to the small, though significant, correlations ($r_s < .23$) and the missing effects for the unpleasant film and the arousal ratings, prior experience with the presented films is believed to be of marginal influence.

Taken together, the presented findings demonstrate successful elicitation of pleasant, neutral and unpleasant emotional states in children by their watching of the selected films. Age, gender or prior experience with the films has only a marginal influence on these effects. The use of these films is therefore proposed in future research on emotions in children.

AUTHOR NOTE

The authors thank M. Mach for technical assistance with generating the film clips; W. von Leupoldt, M. Olbrisch, and colleagues for local assistance in their schools; and especially the children for their participation. Correspondence concerning this article should be addressed to A. von Leupoldt, Department of Psychology, University of Hamburg, Von-Melle-Park 5, 20146 Hamburg, Germany (e-mail: andreas.vonleupoldt@uni-hamburg.de).

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(Manuscript received June 30, 2006;
revision accepted for publication August 1, 2006.)